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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,007	03/25/2004	Yu Jen Chen	24061.102 (TSMC2003.0425)	8989
43717 7590 01/05/2009 HAYNES AND BOONE, LLP IP Section 2323 Victory Avenue Suite 700 Dallas, TX 75219				
EXAMINER STERRETT, JONATHAN G				
ART UNIT 3623		PAPER NUMBER		
MAIL DATE 01/05/2009		DELIVERY MODE PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/811,007

**Applicant(s)**

CHEN ET AL.

**Examiner**

JONATHAN G. STERRETT

**Art Unit**

3623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 march 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date 3-25-04
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. This **Non-Final Office Action** is responsive to 25 March 2004. Currently **Claims 1-22** are pending.

#### ***Claim Rejections - 35 USC § 101***

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

**Claims 1-22** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

**Claims 17-22** are rejected under 35 U.S.C. 101 based on Supreme Court precedent, and recent Federal Circuit decisions, the Office's guidance to examiners is that a § 101 process must (1) be tied to another statutory class (such as a particular apparatus) or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780,787-88 (1876).

An example of a method claim that would not qualify as a statutory process would be a claim that recited purely mental steps. Thus, to qualify as a § 101 statutory process, the claim should positively recite the other statutory class (the thing or product)

to which it is tied, for example by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state.

Here, applicant's method steps, fail the first prong of the new Federal Circuit decision since they are not tied to another statutory class and can be performed without the use of a particular apparatus. Thus, **Claims 17-22** are non-statutory. (the examiner notes that reciting the apparatus as part of the preamble does not overcome the method steps being non-statutory).

**Claim 1** recites an inference engine coupled to a user interface, a knowledge collection module and a calculation module. These elements are interpreted as software per se, not tangibly embodied on computer readable medium. Software per se is considered printed matter and is not statutory re 35 USC 101. **Claims 2-16** depend on **claim 1** and are similarly not statutory.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown, et al; "A Centralized Approach to Factory Simulation", 1997, Future Fab International, pp.1-9, (hereinafter **Brown**).

Regarding **Claims 1 and 17**, Brown teaches:

**1. An inference engine configured to rank a plurality of clients using at least one parameter associated with each of the plurality of clients, the engine comprising:**

**a user interface configured to enable a user to select the at least one parameter;**

page 3 Figure 1, the user interface is configured to allow the user to select at least one parameter in simulation modeling of the fab.

**a knowledge collection module configured to collect client information based on the at least one parameter; and**

page 2 para 5, data is imported of at least one parameter to model a wafer fab

**a calculation module configured to receive the collected information and calculate a client listing using a parameter-based cost function.**

page 2 para 5,6; page 3 Figure 1, the semiconductor facility information is received and run through the capacity, cost and simulation engines (i.e. a calculation module).

Brown teaches calculating cost parameters and performance parameters for a wafer fab (i.e. semiconductor manufacturing). Brown further teaches that the simulation can be provided for various factories as part of a consulting effort to help individual factories improve performance. While Brown does not explicitly teach ranking the various factories in a list (i.e. benchmarking list), Official Notice is taken that this approach is old and well known in the art, and would have been obvious to combine with Brown's teachings by one of ordinary skill in the art at the time of the invention since Brown teaches improving the performance of various factories based on that factory's individual data. This would have provided a predictable result by benchmarking the factories against each other in a list to show their relative performance.

Regarding **Claim 2**, Brown teaches:

**2.The inference engine of claim 1 wherein the at least one parameter includes one of manufacturing technology, product type, volume of purchase order, client physical region, design library, tapeout instance, technology file, and chip implementation.**

Page 4 #2; since Brown's factory is a wafer fab (i.e. silicon wafer), the parameter is chip implementation.

Regarding **Claims 3 and 4**, Brown teaches the simulation of a wafer fab using a computer based modeling approach. While Brown does not explicitly teach various

circuit widths in silicon (as per Claim 3 or different types of solid state devices, as per Claim 4), these aspects of semiconductor manufacturing are old and well known in the art (Official Notice) and would have provided a predictable result in combination with the teachings of Brown because Brown teaches various simulation and modeling techniques for a semiconductor manufacturing facility (i.e. a wafer fab). Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the circuit width aspects of Claim 3 and the solid state device types of Claim 4 into the teachings of Brown because these elements are known in the art and would have provided a predictable result in combination with Brown's teachings.

Regarding **Claim 5**, Brown teaches:

**5. The inference engine of claim 1 wherein the parameter-based cost function comprises the at least one parameter.**

Page 4 Figure 2, cycle time is a cost parameter – other parameters are used in modeling cycle time, which impacts the cost function.

Regarding **Claim 6**, Brown teaches:

**6. The inference engine of claim 5 wherein the parameter-based cost function further comprises at least one weighting factor corresponding to the at least one parameter.**

Page 4 #2, since the factory cost curve that models the various parameters is based on the relationship between the various parameters, then these parameters are combined (i.e. weighted, since they are combined together).

Regarding **Claim 7**, Brown teaches:

**7. The inference engine of claim 6 wherein the parameter-based cost function is a linear function including at least one term wherein each term is a product of one of the at least one parameter and one of the at least one weighting factor correspondingly.**

As per claim 6, Brown teaches a cost curve that is a function of various parameters. Since these parameters are combined, this implies that there is a weighting factor used in combining the various factors (i.e. even in a simple additive combination, the factors would have weights of 1, e.g.  $x = y + z$ ).

Regarding **Claim 8**, Brown teaches:

**8. The inference engine of claim 6 wherein the parameter-based cost function is a non-linear function.**

Page 4 Figure 2, cycle time is a non-linear cost function per cost per good unit out.

Regarding **Claim 9**, Brown teaches:



**9. The inference engine of claim 1 wherein the parameter-based cost function is built in the calculation module.**

Page 3 Figure 1 – the cost engines are built into the Factory Explorer™ software.

Regarding **Claim 10**, Brown teaches:

**10. The inference engine of claim 1 wherein the parameter-based cost function is set up by a user.**

Page 5 bottom para, the parameter based cost function (i.e. operator constraints) is set up by the user.

Regarding **Claim 11**, Brown teaches:

**11. The inference engine of claim 1 wherein the inference engine is further connected to a virtual fab.**

Page 3 Figure 1 and Page 4 top paragraph, the Factory Models are connected to the Capacity, Cost and Simulation engines, i.e. a virtual fab.

Regarding **Claim 12**, Brown teaches:

**12. The inference engine of claim 11 wherein the knowledge collection module collects the client information from a plurality of client databases in the virtual fab.**

Page 3 Figure 1, the collection of information comes from a combination of models – see also page 3 bottom para – input data for models. While Brown does not

teach a plurality of client databases for data input, Brown does teach the input of various data from different client database (since Brown is teaching the modeling of more than one factory). Official Notice is taken that inputting data from a database, where the data is stored in the database, is old and well known and would have provided a predictable result in combination with the teachings of Brown regarding the modeling of various factories. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Brown regarding modeling various client factories to include where the data comes from a client database because it would have provided a predictable result in the modeling of various factories by using data stored in a database for each factory.

Regarding **Claim 13**, Brown teaches

**13. The inference engine of claim 11 wherein the virtual fab is an entity of network.**

Page 7, "concluding remarks", Brown teaches that managing an individual factory is an important element in supply chain management (i.e. the supply chain is a type of network)

Regarding **Claim 14**, Brown teaches a supply chain network as per Claim 13 above, and teaches a plurality of nodes in processing in a manufacturing setting (see page 5 Figure 3 and the Operator constraints on cycle time - i.e. implying worker nodes for processing wafers) While Brown's teachings do not include the various nodes as

listed, Official Notice is taken that it is old and well known in the art to simulate based on a plurality of nodes (ie.. as in a supply chain management context). The types of nodes further claimed are taken under Official Notice to be old and well known in the art in semiconductor manufacturing. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Brown's virtual fab teachings of semiconductor manufacturing, to include the additional nodes of a an engineer entity; a foundry entity; a design library entity, because it would have provided a predictable result in simulation of a wafer fab. Further, Brown notes a variety of data inputs, but not a database for managing those data inputs, however, the use of databases is old and well known in the art and would have provided a predictable result in providing a data repository for input in to the simulation teachings of Brown and thus it would have been obvious to one of ordinary skill in the art at the time of the invention to include a plurality of databases to function as input data repositories into the simulation teachings of Brown, because it would have provided a predictable result in providing a repository for data to be retrieved from in modeling the various wafer fabs as taught by Brown.

Regarding **Claim 15**, Brown teaches:

**15. The inference engine of claim 1 wherein the user interface provides an interface of communication between a user and the inference engine.**

Page 3 Figure 1, the user interface provides an interface of communication between the various engines and the output reports and charts that communicate the status of the wafer fab simulations.

Regarding **Claim 16**, Brown teaches:

**16. The inference engine of claim 15 wherein the communication comprises:**

**selecting parameters for the cost function;**

page 4 #1, a factory simulation of a line selects parameters for the cost function describing the output of the line

**selecting the cost function;**

page 4 Figure 2, cost per good unit output is the cost function selected

**selecting a weighting factor for each of the parameters;**

page 4#2, since the analyst creates a curve that shows the relationship between the factors, this is selection of a weighting factor for the various parameters.

**choosing time scope and region scope; and**

Page 4 Figure 2, days is the time scope – the region scope is the particular factory.

**displaying a result.**

Page 4 Figure 2, the result of the simulation for a particular wafer fab line is displayed.

**Claims 17-22** recite similar limitations to those addressed by the rejection of **Claims 1-16** above, and are therefore rejected under the same rationale.

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Jain, et al; "Criticality of Detailed Modelling in Semiconductor Supply Chain Simulation", Proceedings of the 1999 Winter Simulation Conference, pp.1-9.

Rasmussen; "Integration simulation with activity-based management to evaluate manufacturing cell part sequencing", 1999, Computers & Industrial Engineering 37, pp.757-768.

Spedding, T.A.; Sun, G.Q.; "Application of discrete event simulation to the activity based costing of manufacturing systems", 1999, International Journal of Production Economics, 58, pp.289-301.

Takuwa, Soemon; "The use of Simulation in Activity-based costing for flexible manufacturing systems", 1997, Proceedings of the 1997 Winter Simulation Conference, pp. 793-800.

Miller, David J; "Simulation of a semiconductor manufacturing line", October 1990, Proceedings of the ACM, Vol. 33, No. 10, pp.99-108.

Hood, Sarah J; Welch, Peter D; "Response Surface Methodology and Its Application in Simulation", Proceedings of the 1993 Winter Simulation Conference, pp.115-122.

Czarnecki, Hank; Schroer, Bernard J; Rahman, M. Mizzanur; "Using Simulation to Schedule Manufacturing Resources", 1997, Proceedings of the 1997 Winter Simulation Conference, pp. 750-757.

Whitman, Larry; Huff, Brian; Palaniswamy, Senthil; "Commercial Simulation over the Web", 1998, Proceedings of the 1998 Winter Simulation Conference, pp. 335-339.

Nembhard, Harriet Black; Kao, Ming-Shu; Lim, Gino; "Integrating Discrete-Event Simulation with Statistical Process Control Charts for Transitions in a Manufacturing Environment", 1999, Proceedings of the 1999 Winter Simulation Software, pp. 701-708.

Potoradi, et al; "Determining Optimal Lot size for a Semiconductor back-end Factory", 1999, Proceedings of the 1999 Winter Simulation Conference, pp. 720-726.

US 6,151,582 by Huang discloses a decision support system for management of an agile supply chain.

US 5,970,465 by Dietrich discloses a method for part procurement in a production system with constrained resources.

US 4,744,028 by Karmarkar discloses a method and apparatus for efficient resource allocation.

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan G. Sterrett whose telephone number is 571-272-6881. The examiner can normally be reached on 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Beth Boswell can be reached on 571-272-6737. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

6. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JGS 1-1-09

/Jonathan G. Sterrett/

Primary Examiner, Art Unit 3623